

High Performance Flow Analysis and Control Tools for Aerial Vehicles, Phase I

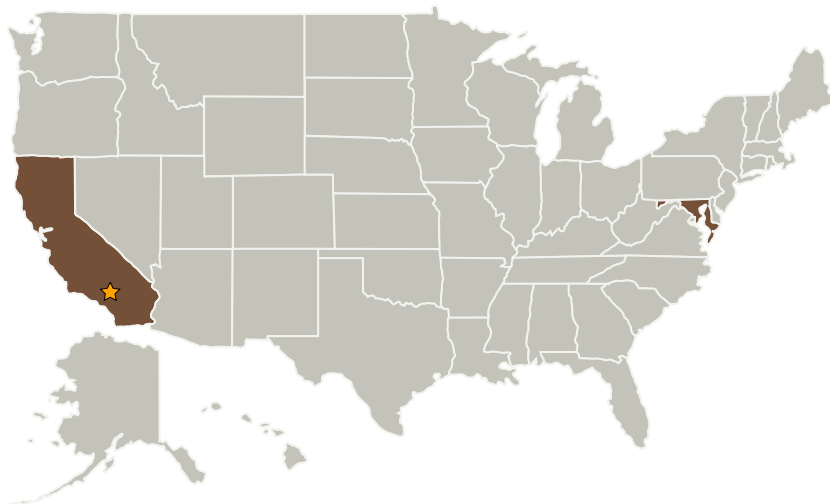
Completed Technology Project (2004 - 2004)



Project Introduction

The objective of the project is the design and development of an open architecture, computer aided control design toolbox for distributed parameter systems, in particular to aerodynamic control for high performance applications in aerial vehicles. Especially, for unmanned aerial vehicles, small actuators can have a big aerodynamic impact. An effective controlled network of distributed micro actuators and sensors can enable aggressive performance not possible through traditional control surfaces like aileron, elevator, rudder and flaps. Even for larger aircraft the emerging paradigm for control involves an array of actuators and distributed sensing. In addition to enhanced performance this provides much greater redundancy that can be utilized to confront battle damage or actuator and sensor failures in commercial jet liners. We propose the use of integrated set of computing tools including 3D drawing tools, symbolic processing tools, numerical tools and visualization software for 3D animated graphics for the development. With continuing advances in distributed actuation and sensing technologies these tools will find widespread application in emerging unmanned aerial vehicle industry. The toolbox in conjunction with commonly used numerical software will provide designers the ability to seamlessly test control design by integrating and automating several key steps in the design cycle.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Armstrong Flight Research Center (AFRC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Armstrong Flight Research Center(AFRC)	Lead Organization	NASA Center	Edwards, California
Techno-Sciences, Inc.	Supporting Organization	Industry	Beltsville, Maryland

Primary U.S. Work Locations	
California	Maryland

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Gaurav Bajpai

Technology Areas

Primary:

- TX15 Flight Vehicle Systems
 - └ TX15.1 Aerosciences
 - └ TX15.1.5 Propulsion Flowpath and Interactions